METHOD AND APPARATUS FOR SIGNALING REFERENCE SIGNALS TO A UE IN AN LTE SYSTEM

[0001] This disclosure relates to a method and apparatus and in particular but not exclusively to methods and apparatus usable in a system which makes use of reference information.

[0002] A communication system can be seen as a facility that enables communication sessions between two or more nodes such as fixed or mobile devices, machine-type terminals, access nodes such as base stations, servers and so on. A communication system and compatible communicating entities typically operate in accordance with a given standard or specification which sets out what the various entities associated with the system are permitted to do and how that should be achieved. For example, the standards, specifications and related protocols can define the manner how devices shall communicate, how various aspects of communications shall be implemented and how devices for use in the system shall be configured.

[0003] Users can access the communication system by means of appropriate communication devices. A communication device of a user is often referred to as user equipment (UE) or terminal. A communication device is provided with an appropriate signal receiving and transmitting arrangement for enabling communications with other parties. Typically a device such as user equipment is used for enabling receiving and transmission of communications such as speech and content data.

[0004] Communications can be carried on wireless carriers. Examples of wireless systems include public land mobile networks (PLMN) such as cellular networks, satellite based communication systems and different wireless local networks, for example wireless local area networks (WLAN). In wireless systems a communication device provides a transceiver station that can communicate with another communication device such as e.g. a base station of an access network and/or other user equipment. The two directions of communications between a base station and communication devices of users have been conventionally referred to as downlink and uplink. Downlink (DL) can be understood as the direction from the base station and uplink (UL) the direction to the base station.

[0005] Various control information may need to be signalled between the parties. Control information is typically communicated on control channels, for example on physical uplink control channel (PUCCH) or physical downlink control channel (PDCCH). Furthermore, a large portion of the control signalling may be conveyed via PDSCH/PUSCH (physical downlink shared channel/physical uplink shared channel) as part of higher layer signalling.

[0006] According to an aspect, there is provided a method comprising: determining amount information relating to an amount of reference information a user equipment is to provide; causing said amount information to be provided to said user equipment; and using reference information from said user equipment to process data from said user equipment.

[0007] The amount information may comprise a frequency for which said reference information is to be provided.

[0008] The amount information may indicate on which slots and/or symbols said reference information is to be transmitted.

[0009] The symbols may comprise SC-FDMA symbols.

[0010] The amount information may indicate which subframes said reference information is to be transmitted.

[0011] The amount information may comprise information identifying one of a plurality of available options.

[0012] The amount information may comprise link adaptation information.

[0013] The link adaptation information may comprise at least one of coding and modulation information, transport block size and transmission rank.

[0014] The method may comprise using said reference information to demodulate said data.

[0015] The reference information may comprise at least one of demodulation reference signals and sounding reference signals.

[0016] The causing may comprise causing said information to be sent to user equipment via a downlink channel.

[0017] The amount information provided to the user equipment may comprise at least one of dynamic and semi-static information.

[0018] The method may comprise using previous reference information to process current data from said user equipment.

[0019] The method may comprise determining amount information relating to an amount of reference information a user equipment is to provide on an uplink channel and using said reference information from said user equipment to process data on said uplink channel from said user equipment.

[0020] This method may be performed in a base station.

[0021] According to another aspect, there is provided a base station which is configured to perform the previous method (s).

[0022] According to another aspect, there is provided a method comprising: receiving information from which an amount of reference information a user equipment is to provide is obtained; and causing reference information to be provided to a base station in accordance with said received information.

[0023] The method may comprise causing data to be provided to a base station, an amount of said data being dependent on said amount of reference information.

[0024] The received information may comprise link adaptation information from which said amount of reference information is determined.

[0025] The link adaptation information may comprises at least one of coding and modulation information, transport block size and transmission rank.

[0026] The above discussed method(s) may be performed by a user equipment.

[0027] According to another embodiment, there is provided a user equipment configured to perform one or more of the above method steps.

[0028] According to another aspect, there is provided an apparatus comprising: determining means for determining amount information relating to an amount of reference information a user equipment is to provide; causing means for causing said amount information to be provided to said user equipment; and means for using reference information from said user equipment to process data from said user equipment.

[0029] The amount information may comprise a frequency for which said reference information is to be provided.

[0030] The amount information may indicate on which slots and/or symbols said reference information is to be transmitted.

[0031] The symbols may comprise SC-FDMA symbols.

[0032] The amount information may indicate which subframes said reference information is to be transmitted.